

A COMPARISON OF EXERCISE VERSUS LIFESTYLE CHANGE  
PROGRAMS IN AN OCCUPATIONAL SETTING

by

Donna M. Genett

B.A., University of Wisconsin, Stevens Point, 1980

M.A., University of Missouri, Kansas City, 1983

Submitted to the Department of  
Counseling Psychology and the Faculty of the  
Graduate School of the University of Kansas  
in partial fulfillment of the requirements  
of the degree of Doctor of Philosophy.

Dissertation Committee:

**Redacted Signature**

**Redacted Signature**

**Redacted Signature**

Dissertation defended: May 14, 1986

A Comparison of Exercise Versus Lifestyle Change  
Programs in an Occupational Setting

Donna M. Genett, Ph.D.

University of Kansas, 1986

Wellness programs for relieving job stress and for decreasing the incidence of physical and mental illness have been implemented in the workplace with increasing frequency over the past few years. These programs usually incorporate two types of interventions. These include active interventions such as exercise programs, and didactic interventions such as lifestyle change programs. The purpose of this investigation was to compare the impact of active versus didactic interventions on job stress, job satisfaction, and other health-related variables.

This study was conducted at AT&T Communications in Kansas City, Missouri from January to April, 1986. A total of 110 employees participated in the study. Measures included two self-report instruments, including the Job Tension Index, and the Job Description Index. A general self-report questionnaire regarding health-related behaviors was also used. Finally, blood pressure was taken with a mercury sphygmomanometer, and pulse was taken from the radial artery.

Data were analyzed using a variety of multivariate statistical techniques. The analyses revealed that the

exercise program was associated with positive changes on some of the dependent measures, including estimates of fitness, satisfaction with people and supervision on the job, and satisfaction with the job in general. Neither the exercise nor the lifestyle change programs were associated with improvements on the remaining dependent measures. Despite the lack of support for the initial hypotheses delineated for this study, the finding that the exercise program was associated with positive changes in job satisfaction was an addition to research in this field. This study supports findings of previous research in that wellness programs show promise; however, further research is necessary to establish their effectiveness.

## ACKNOWLEDGEMENTS

I would like to extend my appreciation to the following people who contributed to the completion of this study:

Dr. Sherry Borgers, my advisor, for her forthrightness and guidance through this study, and over the past three years;

Dr. Ed Wike for his statistical assistance;

Dr. Tony Mendez, and the TLC staff and participants at AT&T for their cooperation in making this study a reality;

My parents for their emotional and financial support and my brother and sister for their faith and encouragement. I would also like to thank the Brost family for their interest and encouragement, and for being like a second family to me.

Finally, I would like to thank my dearest friends, Aleta and Nancy, for their unconditional love and belief in me, and for always having the right words at the right times.

## TABLE OF CONTENTS

CHAPTER	Page
1. INTRODUCTION	1
Theoretical Basis and Definition of Terms...	1
Need for the Study.....	3
Statement of the Problem.....	5
2. LITERATURE REVIEW	7
3. METHOD	24
Subjects.....	24
Measures.....	24
Procedure.....	26
4. RESULTS	29
5. DISCUSSION	44
6. REFERENCES	51
7. APPENDICES	58
Job Tension Index.....	58
Job Description Index.....	61
General Questionnaire.....	67
Statement of Consent.....	69
Group Means on the Dependent Variables at Posttesting.....	70

## LIST OF TABLES

Table	Page
1. Group Means on the 18 Dependent Variables at Pretesting.....	30
2. Pretest - Posttest Mean Difference Scores on the 18 Dependent Variables for the Six Groups.....	36
3. Highest Loadings of the Dependent Measures on the Factors from the Principal Components Analysis.....	41

# CHAPTER 1

## Introduction

### Theoretical Basis and Definition of Terms

In recent years there has been a growing emphasis on health and well-being in our society. As opposed to "illness," Dunn (1961) coined the term "wellness" to describe a state of optimum physical and mental health. Wellness involves an integrated way of functioning which maximizes the potential of an individual within the environment in which that individual is functioning. Similarly, in 1947, the World Health Organization defined health as a state of physical, mental, and social well-being, not just the absence of illness. More recently, Ardell (1979) delineated five dimensions of wellness, including self-responsibility, nutritional awareness, physical fitness, stress management, and environmental sensitivity. Ardell further stated that wellness emphasizes prevention, which focuses on the promotion of health and well-being, as opposed to treatment which focuses on illness.

Wellness is a concept that emerged from the area of holistic health. Holistic health, which espouses an interdependence of mind, body, and soul, can be traced back as far as Aristotle. For many years western society has viewed mind and body as separate entities. Mental health and physical health have been conceptualized and

treated independently of each other. More recently, holistic health and health psychology have acknowledged, once again, the interaction of mind and body. Within the area of health psychology, the fields of behavioral medicine and behavioral health have been defined (Matarrazo, 1980). Behavioral medicine focuses on the psychological/medical treatment of disorders while behavioral health focuses on the psychological/medical promotion of health and prevention of illness. Thus, health psychology employs professionals in psychology and medicine for treatment and prevention programs which emphasize mind and body interaction. From this perspective, wellness has emerged as a practical, lifestyle approach that supports the interrelationship between physical and mental health and focuses on prevention rather than treatment.

Wellness programs in the workplace are an offshoot of the wellness concept. Matarrazo (1980) put the challenge to business and industry to promote individual health by educating employees to adopt healthier lifestyles through prevention-oriented programs. In addition, Matarrazo suggested that the workplace is an especially well-suited setting for health promotion programs because of factors such as availability, accessibility, and stability. Wellness programs typically focus on such areas as exercise, nutrition education, weight control, stress



management, smoking cessation, hypertension control, and interpersonal communications. Businesses are realizing that poor employee health is costly because of poor job performance, increased absenteeism and turnover, and increased health care costs (Matarrazo, 1980; Parkinson, 1982). For some businesses the response to these expenses has been to provide education and incentive to employees to improve their well-being through wellness programs at the worksite. According to Ardell (1979), there are over 400 companies which provide wellness programs to their employees, with that number increasing rapidly.

#### Need for the Study

Because wellness promotion in the workplace is a relatively new concept, only preliminary data are available on the efficacy of these programs. According to Parkinson (1982), there are two wellness studies which have preliminary data, Johnson and Johnson's "Live for Life" program and Control Data's "Stay Well" program. Both programs utilize nutrition education, weight control, stress management, fitness, and smoking cessation. These two organizations have found their wellness programs to have the potential for the generalization and maintenance of lifestyle change because of the social climate that is generated in the workplace. Thus, individuals who quit smoking are more likely to begin a fitness program and vice versa. Furthermore, individuals who make lifestyle

changes influence their co-workers through incentives and role-modeling. Preliminary data from these programs revealed, at a one-year follow-up, that a significant number of participants in the wellness program had lower cholesterol levels, lower blood pressure levels, exercised more, and smoked less as compared with pretreatment levels. In addition, drops in absenteeism, turnover, and the number of disability and health care claims were found (Parkinson, 1982).

Despite these encouraging findings, more research is needed to establish the claims of effectiveness that have been made by preliminary studies. Given the rising popularity of wellness programs and their implementation at the worksite, this need for research grows more critical. Aside from the research on wellness programs as a whole, research has been reported on the individual components of wellness programs. For example, research on stress management programs in occupational settings has been reported by Schwartz (1980), on fitness programs by Fielding (1982) and Haskell and Blair (1980), on weight control and nutrition education programs by Fielding (1982) and Foreyt, Scott, and Gotto (1980), on smoking cessation programs by Danaher (1980) and Fielding (1982), and on hypertension control programs by Alderman, Green, and Flynn (1980) and Fielding (1982). The consensus of this research suggests that, although these programs offer

promise, more research is necessary to establish their effectiveness. Furthermore, in most of the research, the effectiveness of the various programs is based on such factors as amount of weight lost, number of persons who quit smoking, and decreases in blood pressure. While these are important factors, other salient outcome variables such as job satisfaction, job stress, and absenteeism have been frequently overlooked (Moss, 1977). Another factor which may be important to consider is whether there is a difference in effectiveness between active programs (exercise) and more passive didactic programs. Passive educational programs typically include lifestyle change classes such as nutrition education, weight control, smoking cessation, and stress management.

#### Statement of the Problem

Based on the paucity of research evidence available on wellness programs and on their increasing popularity, it is evident that more research is necessary to adequately evaluate the efficacy of these programs as a whole, as well as of their individual components. It is also necessary to look at a variety of outcome measures. Factors such as job satisfaction, job stress, and absenteeism may be influenced as a result of wellness programs, and these variables have been overlooked in the research which has been done to date. Finally, there is

no research available which compares the relative efficacy of active versus didactic types of interventions.

It was the purpose of this study, then, to examine the effectiveness of the various aspects of a wellness program within an occupational setting. This study looked at a variety of outcome variables including measures of weight, blood pressure, heart rate, absenteeism, use of tobacco, caffeine, and alcohol, and self-reported measures of fitness, job stress, and job satisfaction. Finally, this study evaluated the relative effectiveness of an active (exercise) intervention versus didactic (lifestyle change classes) interventions.

It was proposed that the exercise program would have a significantly greater impact on all outcome measures than the lifestyle change programs. It was predicted that the exercise program would increase job satisfaction and estimates of fitness, and would reduce job stress to a greater degree than the lifestyle change programs. It was predicted that the exercise program would decrease blood pressure, heart rate, weight, absenteeism, and the use of tobacco, caffeine, and alcohol to a greater degree than the lifestyle change programs. No differences between the exercise and lifestyle change programs were expected on the basis of sex, age, or job status.

## CHAPTER 2

### Literature Review

Job satisfaction is an important topic in the vocational development area of psychology. A process and outcome relationship may be viewed between vocational development and job satisfaction. That is, as individuals develop vocationally, they develop insight, self-awareness, decision-making skills, and eventually, the ability to make vocational choices. Vocational choices that are appropriate for the individual can lead to job satisfaction. On the other hand, inappropriate choices can lead to job dissatisfaction and eventual career change.

Job satisfaction has been a widely researched topic in psychology. Locke (1976) estimated that over 3,000 articles and dissertations have been produced to date, with that number rising every year. Considering the percentage of our lives spent working, it is not surprising to find that job satisfaction is a popular area. Not only is job satisfaction important to workers, but also to employers. Job satisfaction may increase productivity and decrease absenteeism and turnover rates, thereby increasing profits to the organization (Gruneberg, 1979).

The first step in examining job satisfaction is to define what is meant by the term. Locke (1976) defined

job satisfaction as a positive emotional state which results from the appraisal of one's job. This is not the only definition, however. Based on different theories and measures, Wanous and Lawler (1972) delineated nine distinct definitions:

1. Job satisfaction is the sum of the satisfaction with different job facets and the relative importance of those facets across all facets of the job.

2. Job satisfaction is the sum of need fulfillment summed across job facets.

3. Job satisfaction is the sum of the relative importance of job facets and how much they contribute to need fulfillment, summed across job facets.

4. Job satisfaction is the difference between how much satisfaction there is with different job facets and how much satisfaction there should be with those facets.

5. Job satisfaction is the difference between how much satisfaction there is with different job facets, how important those facets are, and how much satisfaction there should be with those facets.

6. Job satisfaction is the difference between the degree of satisfaction there is now with different job facets and how much satisfaction the individual would like there to be with those facets.

7. Job satisfaction is the difference between the degree of satisfaction there is now with different job

facets, the importance of the facets, and how much satisfaction the individual would like from those facets.

8. Job satisfaction is the discrepancy between the importance of a job facet and the perceived fulfillment from that facet.

9. Overall job satisfaction is the sum of the satisfaction with different job facets across all facets of the job.

Since the focus of this study is on overall job satisfaction, as opposed to need fulfillment or specific job facet satisfaction, the last definition was the one employed for this study.

The next step in examining job satisfaction is to examine the major theories behind these definitions of job satisfaction. One of the more popular theories developed by Maslow (1943) suggests that job satisfaction involves the fulfillment of needs. These needs can be represented as a hierarchy of five needs: (a) basic physiological needs, (b) safety needs, (c) social needs, (d) esteem needs, and (e) self-actualization needs. Physiological, safety, and social needs are considered to be lower-order needs. Esteem and self-actualization needs are higher-order needs. Maslow contends that the lower-order needs must be met before an individual is able to seek fulfillment of the higher-order needs. This theory suggests, then, that only if an employee's lower-order

needs for salary and job security are fulfilled will the employee be able to seek gratification and achievement from the work itself.

Another popular theory of job satisfaction which relates to Maslow's need hierarchy is Herzberg's (1959) two-factor theory. Sometimes called the motivation-hygiene theory, Herzberg labelled one set of factors as motivators and the other set as hygiene factors. Motivators are intrinsic work factors such as achievement, recognition, and opportunity for growth or advancement. These factors lead to satisfaction and correspond to Maslow's higher-order needs. Hygiene factors are extrinsic and include such things as salary, security, and working conditions which, if inadequate, lead to job dissatisfaction. However, if these hygiene factors are adequate, they do not lead to job satisfaction. These factors correspond to Maslow's lower-order needs. Thus, according to Herzberg's theory, the causes of job satisfaction and dissatisfaction are quite distinct. Hygiene factors are necessary conditions for, but do not produce, job satisfaction. Motivators, on the other hand, produce satisfaction but, if not present, do not produce dissatisfaction.

Three other prominent theories have been outlined by Gruneberg (1979). These theories include equity theory, reference group theory, and need fulfillment theory.



Equity theory suggests that job satisfaction results from a tacit agreement between employer and employee that for a certain amount of work there will be a certain amount of reward. Employees compare their efforts and rewards with other employees. If their rewards and efforts are comparable to those of fellow employees, satisfaction will result.

Reference group theory (Gruneberg, 1979) contends that an understanding of the groups with whom the individual relates or identifies is of prime importance in understanding job satisfaction. These reference groups may be the employee's friends or workmates. On the basis of this theory, individuals will be satisfied on the job to the extent that they receive the same pay, benefits, and recognition, that fellow employees of similar education and experience receive. If, for example, an employee is paid less than someone with less education and/or experience, dissatisfaction will ensue. If, however, two employees with the same amount of education and experience are paid equal amounts, satisfaction occurs.

Need fulfillment theory (Gruneberg, 1979) takes two forms, the subtractive model and the multiplicative model. The subtractive model states that job satisfaction is negatively related to the degree of discrepancy between what the individual needs and the extent to which the job

fulfills those needs. The less the discrepancy, the greater the satisfaction. The multiplicative model stresses the relative strengths of different needs. In this model the perceived amount of need fulfillment offered by the job is multiplied by the importance of that need to the individual. The products of the various needs are then added together to give a complete measure of satisfaction.

From this overview of the major theories it seems apparent that job satisfaction involves some amount of matching between an individual's needs and expectations and what the job offers. No one theory accounts for all the factors involved in job satisfaction all the time. However, the theories can provide a framework for understanding the complex topic of job satisfaction.

As previously stated, job satisfaction is a widely studied area in psychology. One of the main reasons for studying satisfaction, according to Gruneberg (1979), relates to the generally held belief that satisfaction is related to productivity, absenteeism, turnover rates, and physical and mental health. Since research has not supported the presence of a relationship between productivity and job satisfaction (Brayfield & Crockett, 1955; Vroom, 1964), no further discussion of this area will be presented here. Instead the focus for discussion will be on absenteeism, turnover rates, and physical and

mental health.

Absenteeism and turnover can be viewed as two aspects of a single phenomenon; that is, withdrawal from the workplace. The difference between them is the length of the withdrawal. Absenteeism may occur in place of turnover when acquisition of a new job is unrealistic. Lyons (1972) found a relationship between absenteeism and turnover; that is, absenteeism can be a predictor of future job termination. Although a relationship exists, the two factors must be considered independently because absenteeism does not always lead to turnover, and turnover can occur without previous absenteeism.

Evidence concerning the relationship between job satisfaction and absenteeism is generally inconclusive (e.g., Nicholson, Brown, & Chadwick-Jones, 1976; Vroom, 1964). According to Gruneberg (1979), confusion in the research stems from the fact that absenteeism is difficult to measure because of the diverse reasons behind choosing to be or not to be absent from work. He offers three explanations for making the choice to not be absent from work that are unrelated to job satisfaction: (a) people may feel it is wrong to receive pay without working, (b) people may be afraid of losing their jobs, and (c) absenteeism may have a negative effect on future references. It appears, then, that people may attend work regardless of the lack of job satisfaction, and, on the

other hand, people may accrue absences without being dissatisfied. Thus, the relationship between absenteeism and job satisfaction is nebulous.

Research on the relationship between turnover and job satisfaction is more conclusive than that between job satisfaction and absenteeism. Porter and Steers (1973) examined 15 published studies and found a positive relationship between turnover and job satisfaction in all but one study. They also found a variety of satisfaction-related variables involved in turnover, including low pay, lack of opportunity for advancement, and dissatisfaction with job content.

An interesting finding in various studies is the relationship between job satisfaction and physical and mental health. For example, in studying the effects of job satisfaction on the individual, Palmore (1969) found satisfaction to be the best predictor of longevity. However, before further examining the relationship between job satisfaction and physical and mental health, a general background on stress is in order because so much of the literature on this relationship involves the topic of stress.

Selye (1936) is most commonly credited for popularizing the term "stress." He referred to stress as an organismic reaction in response to nonspecific stimuli called stressors. Selye (1936) distinguishes between

stress as pleasure, challenge, or fulfillment (eustress), and stress as frustration, anxiety, or fear (distress). Eustress leads to creativity and harmony while distress leads to physical and psychological disruption of the individual. Selye's definition of stress is a response-based definition. Stimulus-based definitions view stress as stimuli or events impinging on the organism. As a result of more current research and of the growing field of behavioral medicine, stress is coming to be viewed as a complex interrelated process involving a number of psychological and physiological factors. Hence, relational or interactional definitions of stress are gaining more widespread attention. These definitions often include factors such as cognitive appraisal and coping, and suggest that it is the interaction between the person and the environment which is of primary importance when dealing with stress. For example, Cox and Mackay (1976) proposed a complex transactional or feedback model of stress which not only draws from stimulus- and response-based definitions, but also emphasizes the ecological and transactional nature of stress phenomena. Lazarus and Folkman (1984) proposed a relational definition in which stress is seen as a person-environment relationship that is appraised by the person as exceeding the person's resources. Definitions of stress on the job appear to fall most often into the category of

interactional definitions of stress. Cooper and Marshall (1976) define occupational stress as negative environmental factors or stressors which interact with characteristics of the individual and which are associated with a particular job. Pelletier (1977) more generally defines job stress as a lack of harmony between an individual and his or her work environment.

With this background of stress in mind, focus may once again be turned to the relationship between job satisfaction and physical and mental health. Many studies have looked at this relationship with respect to coronary heart disease and mental ill health. Studies cited by Jenkins (1971) revealed that job dissatisfaction can lead to stress that can lead to heart disease. French and Caplan (1973) discussed the effects of organizational stress on psychological and physiological strains leading to coronary heart disease. Their discussion was based on a program of research carried out in 1957 by the Institute for Social Research at the University of Michigan. Also on the basis of this research, Caplan (1975) suggested that job dissatisfaction was a key factor in the relationship between job stress and physical and mental disorders. Theorell and Rahe (1970) compared heart disease patients to normals and found that heart disease patients differed from normals in three ways: (a) greater dissatisfaction with their jobs, (b) excessive overtime

work, and (c) hostility directed at others who slowed them down. Looking at different occupational groups, Sales and House (1971) found that certain occupational groups had higher job dissatisfaction and higher mortality from coronary heart disease than other occupational groups. Gruneberg (1979) cited studies that have found that job dissatisfaction can lead to stress that, in turn, can lead to heart disease and mental illness. Cooper and Marshall (1976) presented an excellent review of the literature on occupational stress and its relationship to heart disease and mental ill health with many of the studies also focusing on job satisfaction. A relationship between job dissatisfaction and mental illness has also been suggested by Hoppock (1935) and Fergusen (1973). Finally, Cox (1978) cited studies which link occupational stress to a variety of physical and mental disorders and suggested that job stress can result in job dissatisfaction, absenteeism, lowered productivity and morale, and higher turnover.

On the basis of the research above, it is apparent that a relationship does exist between job satisfaction, job stress, and physical and mental health. Extrapolating from this relationship, it is logical to conclude that methods aimed at alleviating job stress would enhance job satisfaction and promote the physical and mental health of employees. Methods aimed at stress prevention or stress

management would be less costly than methods aimed at pathology correction, both for the individual and for the organization. With a preventative focus in mind, a variety of stress management techniques can be delineated. These methods include cognitive restructuring techniques such as Systematic Rational Restructuring (Goldfried, Decenteceo, & Weinberg, 1974) and Stress Innoculation Training (Meichenbaum & Turk, 1982), and techniques such as relaxation, meditation, biofeedback, nutrition and diet supplementation, and exercise (Morse & Furst, 1979). Of these methods, the one that can be implemented with the greatest ease and practicality within an organization is exercise. In fact, there is a growing interest among organizations in the implementation of exercise programs at the workplace. According to Goldberg (1978), there are over 1000 companies which have in-house fitness facilities, with that number rapidly increasing.

The beneficial effects of exercise in dealing with stress are well documented. Goldberg (1978) lists 11 benefits of exercise noted by various physicians, including the reduction of tension. Morse and Furst (1979) delineate 24 physiological and psychological benefits of exercise in enabling a person to cope with stress and to prevent stress-related diseases. The therapeutic benefits of exercise for relaxation and emotional well-being are discussed by Greenwood (1976).



In a study of stress-produced ailments, Joseph (1967) listed 17 ailments which were relieved after several months for those participating in an exercise program. According to Thomas, Lee, Franks, and Paffenbarger (1981), exercise produces a wide range of physical, psychological, and biochemical changes in the body that serve to combat physical and emotional ill health. These authors discussed occupational exercise and cited various studies which examined the beneficial effects of exercise in protecting against heart disease in a variety of occupational groups. Blumenthal, Williams, Needels, and Wallace (1982) found healthy adults participating in a 10-week exercise program to be significantly more improved in overall psychological functioning than controls who remained sedentary. The sedentary group remained the same or deteriorated in psychological functioning over the 10-week period. In a study with business executives, Kobasa, Maddi, and Pucetti (1982) found that those who exercised remained healthier in the face of stress than those who did not exercise. These authors suggested that exercise buffers stress by decreasing the organismic strain produced by stressful events. Two literature reviews on the physical and psychological benefits of exercise including reductions in the stress emotions (anxiety and depression) and improvements in mood, self-concept, work behavior, and well-being have been presented by Martin and

Dubbert (1982) and Folkins and Sime (1981). Although there is a paucity of research evidence on the efficacy of employee fitness programs to date, what evidence there is shows promise (Fielding, 1982; Haskell & Blau, 1980). Thus, exercise is a useful method for managing stress and promoting physical and mental health, and therefore may enhance job satisfaction.

Aside from fitness programs, a variety of other programs have been implemented in the workplace with increasing popularity. Most of these programs involve lifestyle change or improvement classes aimed at improving the health and well-being of employees. Included in these lifestyle improvement programs are classes in such areas as stress management, weight control, nutrition education, smoking cessation, and hypertension control. Enthusiastic claims have been made, but data that directly test the efficacy of these programs are scarce (Matarrazo, 1980).

Research on stress management programs in industry has been discussed by Schwartz (1980). Some studies have shown improvements in health, performance, and well-being of employees (Peters, Benson, & Porter, 1977), and in employees' heart rate and blood pressure (Peters, Benson, & Peters, 1977) as a result of these programs. However, Schwartz (1980) generally concluded that although the research is encouraging there is not enough data available to draw sound conclusions.

Foreyt, Scott, and Gotto (1980) reviewed the research on weight control and nutrition education programs in occupational settings. Although programs for weight loss have been notoriously ineffective, (Stunkard & McLaren-Hume, 1959) several studies have demonstrated the feasibility of worksite obesity programs (Abrams & Follick, 1983; Stunkard & Brownell, 1980). Attrition rates in these programs are a significant problem, however.

Research on smoking cessation programs at the worksite has been reported by Danaher (1980). The results of this research have been moderately encouraging. It appears that smoking cessation programs can be effective, however, recidivism rates are high (Danaher, 1980; Kanzler, Zeidenberg, & Jaffe, 1976).

Alderman, Green, and Flynn (1980) reviewed the research on the efficacy of hypertension control programs at the workplace. These authors concluded that comprehensive programs involving detection, control, and follow-up are effective, although attrition can be a problem.

On the basis of the research reviewed above, and on a review of research in this area by Fielding (1982), it can be stated that although these programs seem to be moderately successful, important problems such as recidivism and attrition must be addressed, and that

conclusions must remain tentative until further research has been completed. Fielding (1982) also stated that despite these problems, particular characteristics of the worksite, such as program availability, convenient hours, colleague support, and on-going maintenance might enhance the effectiveness of these programs.

From the research documented thus far, it appears that exercise programs have demonstrated a greater efficacy than lifestyle change programs. Exercise programs have been linked with improvements in physical and mental health and with an increased ability to manage job stress. Lifestyle change programs have shown promise in terms of weight reduction, smoking cessation, and hypertension control, but these conclusions remain tentative. Most of the research on exercise programs and lifestyle change programs has focused on outcome measures such as lowered blood pressure and heart rate, and weight loss and smoking cessation. While these are important factors, other salient factors such as job satisfaction, absenteeism, and job stress have been frequently overlooked (Moss, 1977). Also, most studies have looked at the efficacy of specific programs rather than comparing the effects of different types of interventions. This study looked at the frequently overlooked outcome measures of job stress, job satisfaction, and absenteeism, in addition to the usual measures of blood pressure, heart

rate, weight, and use of tobacco, alcohol, and caffeine. This study also compared the relative efficacy of exercise versus lifestyle change programs. In this way, it was hoped that this study would not only serve to replicate the findings of current research but would add new information to the existing data in this field.

## CHAPTER 3

### Method

#### Subjects

Data were collected on employees at AT&T in Kansas City, Missouri which has implemented an employee wellness program including exercise and lifestyle change classes. Numerous employees participated in various aspects of this program which is called the Total Life Concept (TLC) program. Employees were solicited for the study by asking for volunteers to participate in a "stress management" study among those employees who were participating in the TLC program. Of the 110 participants in the study, 25 were male and 85 were female, 36 were in management and 74 were in non-management positions, and 88 were Caucasian, 18 were Black, and 4 were Hispanic. Ages of the participants ranged from 20-75, with a mean age of 36.

#### Measures

The Job Tension Index (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964)(see Appendix A) was used to measure job stress. The Job Tension Index is a self-report questionnaire containing 18 items that describe stressful work situations and asks respondents to rate each item as to the frequency with which it relates to the individual's work experience. Responses range on a continuum from "never" which is scored one point, to "nearly all the time" which is scored five points. Responses are summed

across items to determine a total score. The higher the total score, the more stressful is the work experience.

The instrument used to measure job satisfaction was the Job Description Index (Smith, Kendall, & Hulin, 1969)(see Appendix B). The Job Description Index is a self-report inventory which is organized into six categories including satisfaction with pay, promotion, supervision, type of work, co-workers, and job in general. The job in general subscale was recently added in order to measure overall job satisfaction directly rather than measuring it indirectly by combining the other subscales. Each subscale contains 18 items or adjectives to which respondents answer "yes", "no", or "?". "Yes" answers are scored three points, "no" answers are scored zero, and "?" is scored one point. The higher the score, the greater is the job satisfaction.

Both the Job Tension Index and the Job Description Index are reliable, valid, and widely used instruments (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Vroom, 1964). In addition, the instruments comply with the operational definitions of job stress and job satisfaction delineated for this study. Thus, these instruments were selected as most suitable for the purposes of this study.

Physiological measures of heart rate and blood pressure were also taken. These measures were taken by the researcher at the beginning and the end of each TLC

component. Heart rate was obtained by taking the pulse from the radial artery. Blood pressure was obtained with a mercury sphygmomanometer.

Finally, a general questionnaire regarding age, height, weight, job status, use of tobacco, caffeine, and alcohol, absenteeism, amount of exercise, and estimates of fitness was used (see Appendix C).

### Procedure

As previously stated, employees were solicited by asking for volunteers to participate in a "stress management" study among employees involved in the TLC program (see Appendix D). The TLC wellness program offers classes on a rotational basis. That is, employees involved in one class in a particular session may or may not have been in a different class in the previous session. The session upon which this study was based ran from January 13, 1986 to April 4, 1986. Participants were categorized into one of six groups: (a) exercise last session, exercise this session; (b) exercise last session, lifestyle change class this session; (c) lifestyle change class last session, exercise this session; (d) one lifestyle change class last session, another lifestyle change class this session; (e) no class last session, exercise this session; and (f) no class last session, lifestyle change class this session. Thus, there were three exercise groups and three lifestyle change class



groups. Subjects were categorized in these groups on the basis of their enrollment in the previous and the present sessions.

The exercise program involved either employees individually performing flexibility, strength (weights), and aerobic exercises according to computerized exercise routines, or employees involved in structured aerobics classes with other employees. Both programs were of approximately 45-60 minutes duration and were completed three times weekly. Employees in the TLC exercise program completed their exercise routines individually and at their own convenience. Approximately five different aerobics classes were held with different instructors for each class. Both the TLC exercise and aerobics programs were 12-week programs.

The lifestyle change program included classes in cholesterol/nutrition, hypertension, stress management, interpersonal skills, and weight control. These programs were offered in the form of structured classes. The cholesterol/nutrition class met one hour per week for six weeks. The hypertension class met one hour every other week for eight weeks. The stress management classes met for one and one-half hours per week over eight weeks. The interpersonal skills classes met for one and one-quarter hours per week for eight weeks. Finally, the weight control classes met one hour per week over ten weeks.

Pretest measures including the Job Tension Index, the Job Description Index, the heart rate and blood pressure measures, and the general questionnaire were completed during the week that each group met for the first time. These measures were repeated at posttesting, during the week that the groups met for their final class.

Preliminary analyses of variance were performed on the pretest data to determine how well the groups were discriminated on the basis of each of the measures. These analyses revealed that the groups differed with respect to sex, height, weight, job status, pulse rate, whether or not they exercised, whether or not they smoked, estimates of fitness, and satisfaction with their jobs in general. The groups did not differ with respect to age, blood pressure, consumption of alcohol and caffeine, absenteeism, or satisfaction with work, pay, promotion, supervision, or co-workers. Because of the differences which were found between the groups, analyses of variance were not used for the posttest data analyses. A factor analysis was also performed as part of the preliminary data analysis on the pretest JTI scores. Items were found to load on three factors, including a general job stress factor, a stress related to work load factor, and a stress related to co-workers factor. Thus, three JTI scores were used in the final data analyses rather than an overall JTI score.

## CHAPTER 4

### Results

Two broad research hypotheses were proposed for this study. First, it was predicted that the exercise program would have a significantly greater beneficial impact on all the dependent measures than would the lifestyle change programs. Second, no differences were expected on the dependent variables between the exercise and lifestyle change programs on the basis of sex, age, or job status.

The participants (N=110) who completed this study formed six groups: (a) group 1 - exercise last session, exercise this session (N=24); (b) group 2 - exercise last session, lifestyle change class this session (N=19); (c) group 3 - lifestyle change class last session, exercise this session (N=20); (d) group 4 - lifestyle change class last session, lifestyle change class this session (N=20); (e) group 5 - no class last session, exercise this session (N=15); and (f) group 6 - no class last session, lifestyle change class this session (N=12).

Table 1 displays the means for the six groups on the dependent measures, as well as the mean age and height (Ht.). In the order that they are presented in Table 1, the 18 dependent measures include weight (Wt.), systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse rate (PLS), number of cigarettes smoked per day (Cigs.), cups of coffee per day (Cof.), number of

Table 1

Group Means on the 18 Dependent Variables at Pretesting

Group	1	2	3	4	5	6
Age	32.67	36.63	35.15	38.40	36.53	38.83
Ht.	65.21	67.68	65.80	64.80	67.67	65.17
Wt.	132.50	172.89	155.70	149.75	152.13	154.00
SBP	119.70	124.53	121.20	119.00	121.80	120.17
DBP	75.08	82.11	79.20	79.30	78.00	83.83
PLS	75.00	77.37	86.40	78.30	75.20	81.00
Cigs.	0.00	0.89	2.00	4.75	1.33	3.33
Cof.	0.92	2.00	1.35	3.30	2.40	2.33
Alc.	1.33	2.11	1.25	0.80	2.80	0.08
Abs.	0.58	0.37	0.50	1.20	0.27	0.58
Est.	8.92	9.58	7.25	6.30	7.40	6.42
JTI 1	22.13	23.74	26.20	27.20	24.60	26.58
JTI 2	7.08	6.58	7.70	7.20	6.80	7.33
JTI 3	5.92	7.21	6.75	6.45	6.40	7.08
JDI 1	32.42	31.11	24.70	28.50	30.33	26.58
JDI 2	39.75	36.11	35.70	30.90	38.80	33.00
JDI 3	16.67	8.53	10.80	10.40	17.07	9.00
JDI 4	41.63	41.63	38.70	34.50	41.73	36.08
JDI 5	34.66	41.32	36.75	35.80	35.60	36.00
JDI 6	43.46	39.95	31.50	36.25	41.20	34.08

alcoholic drinks per week (Alc.), number of absences in the past three months (Abs.), self-reported estimates of fitness (Est.), stress related to the job in general (JTI 1), stress related to work load (JTI 2), stress related to co-workers (JTI 3), satisfaction with work (JDI 1), satisfaction with pay (JDI 2), satisfaction with promotion (JDI 3), satisfaction with supervision (JDI 4), satisfaction with people (JDI 5), and satisfaction with the job in general (JDI 6). (See Appendix E for group means on the 18 dependent variables at posttesting.)

Simple analyses of variance were performed on the pretest data to determine whether or not the groups differed on the dependent measures prior to the treatment period. These analyses revealed that the groups differed significantly on some of the dependent measures at pretesting. All analyses of variance had 5,114 degrees of freedom. All post hoc Tukey Honest Significant Difference (HSD) tests were completed at the .05 alpha level. It should be noted that, at pretesting, there were 120 participants. Of the 120 initial participants, 10 were lost from the study because they either were transferred to an AT&T in another city, left the organization, were on vacation at the time of posttesting, or dropped out of the TLC program.

First, the groups differed on the basis of sex ( $F=5.83$ ,  $p<.0001$ ). Lunney (1970) supports the use of

ANOVA with dichotomous data. Post hoc Tukey tests of Honest Significant Difference (HSD) revealed that groups 1, 4, and 6 differed significantly from group 2.

Specifically, the sex ratios for the six groups were as follows: group 1 had 2 males and 22 females, group 2 had 10 males and 9 females, group 3 had 5 males and 15 females, group 4 had 1 male and 19 females, group 5 had 6 males and 9 females, and group 6 had 1 male and 11 females. Thus, groups 1, 4, and 6 were predominantly female, and group 2 was predominantly male.

Analysis of variance showed that the groups differed on the basis of height ( $F=3.61$ ,  $p<.004$ ), and weight ( $F=3.86$ ,  $p<.003$ ). Follow-up Tukey tests suggested that groups 1 and 4 differed significantly from group 2 on the basis of height, and group 1 differed from group 2 on the basis of weight. Looking at the means in Table 1, it can be seen that group 2 was, on the average, taller than groups 1 and 4, and group 2 was heavier than group 1. The differences between the groups in terms of height and weight may reflect the sex differences between the groups.

An analysis of variance showed significant differences between the groups in terms of job status ( $F=3.39$ ,  $p<.007$ ). Post hoc Tukey tests revealed that groups 1 and 3 differed from group 5. Specifically, groups 1 and 3 were mostly non-management, and group 5 was mostly management.

The groups also differed on the basis of pulse rate ( $F=2.85$ ,  $p<.02$ ). Tukey tests showed that groups 1 and 5 differed significantly from group 3. The tabled means show that the pulse rates for groups 1 and 5 were lower than those for group 3.

Another ANOVA revealed significant differences between the groups with respect to amount of exercise ( $F=63.89$ ,  $p<.0000$ ). Post hoc Tukey tests showed that groups 1, 2, 3, and 5 differed from groups 4 and 6. Amount of exercise was essentially a dichotomous variable since people either did not exercise or they exercised at least three times per week for a minimum of 20 minutes. The differences found between the groups is understandable since groups 1, 2, 3, and 5 consisted of people who were in the exercise component of the TLC program either this session or the previous session. Groups 4 and 6, on the other hand, consisted of people who had not yet been in the exercise program.

The groups also differed significantly in terms of the number of cigarettes smoked per day ( $F=2.38$ ,  $p<.04$ ). Specifically, group 1, whose tabled mean is 0, differed from group 4 whose tabled mean is 4.75 cigarettes per day.

An analysis of variance showed group differences on the basis of self-reported estimates of fitness ( $F=6.78$ ,  $p<.0000$ ). Post hoc Tukey tests revealed that group 1 differed significantly from groups 4 and 6, and group 2

differed significantly from groups 3, 4, and 6. Looking at the means in Table 1 shows that groups 4 and 6 had lower estimates of fitness than group 1, and groups 3, 4, and 6 estimated their levels of fitness lower than group 2.

The groups differed with respect to satisfaction with one's job in general ( $F=2.35$   $p<.05$ ). Tukey tests showed that group 1 differed from group 3. The mean JDI 6 score was higher for group 1 than for group 3.

Finally, analyses of variance suggested that the groups differed on the basis of diastolic blood pressure ( $F=2.54$ ,  $p<.03$ ), and satisfaction with promotion ( $F=2.38$ ,  $p<.04$ ). However, post hoc Tukey tests showed that no two groups differed at the .05 level.

The groups did not differ from each other on the basis of age ( $F=1.79$ ,  $p<.12$ ), systolic blood pressure ( $F=0.47$ ,  $p<.79$ ), caffeine consumption per day ( $F=1.85$ ,  $p<.11$ ), alcohol consumption per week ( $F=0.90$ ,  $p<.48$ ), absenteeism ( $F=0.89$ ,  $p<.49$ ), satisfaction with work ( $F=1.46$ ,  $p<.21$ ) satisfaction with pay ( $F=1.03$ ,  $p<.41$ ), satisfaction with supervision ( $F=1.32$ ,  $p<.26$ ), or satisfaction with people ( $F=0.55$ ,  $p<.74$ ).

In view of the pretest differences found among the groups, any differences found among the posttest scores could not be readily interpreted. There is no satisfactory solution to this quasi-experimental design



problem. Two procedures which are commonly used are analysis of difference scores and analysis of covariance of posttest scores. Both of these approaches were used here. However, because of the pretest differences, the findings should be regarded with caution and should be viewed as requiring further studies to assess their validity.

Pretest - posttest difference scores on the dependent measures were used for the final data analyses. Table 2 displays the mean difference scores which included weight (Wt.), systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse rate (PLS), number of cigarettes smoked per day (Cigs.), caffeine consumption per day (Cof.), alcohol consumption per week (Alc.), absenteeism (Abs.), estimates of fitness (Est.), general job stress (JTI 1), stress related to work load (JTI 2), stress related to co-workers (JTI 3), satisfaction with work (JDI 1), satisfaction with pay (JDI 2), satisfaction with promotion (JDI 3), satisfaction with supervision (JDI 4), satisfaction with people (JDI 5), and satisfaction with the job in general (JDI 6).

It should be noted that for some of the measures, including Wt., SBP, DBP, PLS, Cigs., Cof., Alc., Abs., JTI 1, JTI 2, and JTI 3, positive numbers indicate improvement because decreases on these measures from pre- to posttest were desirable. However, for the remaining

Table 2

Pretest - Posttest Mean Difference Scores  
on the 18 Dependent Variables for the Six Groups

Group	1	2	3	4	5	6
Wt.	-0.58	4.36^	2.55^	2.05^	0.13^	1.17^
SBP	-0.47	2.11^	2.50^	-1.00	1.00^	2.34^
DBP	-1.84	5.37^	0.80^	-0.60	-0.53	5.33^
PLS	5.25^	2.84^	7.80^	3.00^	5.20^	3.50^
Cigs.	0.00^	-0.21	-1.45	-1.25	-0.14	1.58^
Cof.	0.38^	0.47^	-0.30	-0.25	-0.07	0.08^
Alc.	-0.38	-0.57	-2.20	-0.05	-0.33	-0.34
Abs.	0.33^	-0.31	-0.25	0.50^	-0.06	0.33^
Est.	-1.00^	-0.63^	-1.35^	-0.30^	-0.80^	-1.08^
JTI 1	-0.12	-0.31	2.30^	0.25^	-1.27	1.25^
JTI 2	-0.17	0.05^	0.45^	0.10^	-0.27	-0.17
JTI 3	0.21^	0.10^	0.40^	0.10^	-0.27	-0.84
JDI 1	0.21	0.90	-1.70^	1.70	1.40	0.25
JDI 2	-3.21^	-1.68^	0.10	-2.90^	-0.27^	2.17
JDI 3	-3.66^	-0.73^	0.90	1.10	2.14	-0.17^
JDI 4	0.42	1.26	-3.20^	0.30	3.93	1.66
JDI 5	-4.09^	5.37	-3.05^	-2.05^	-2.00^	4.42
JDI 6	5.33	1.42	-6.25^	-0.20^	2.67	0.91

Note. ^ signifies a change in the predicted direction.

measures, including Est., JDI 1, JDI 2, JDI 3, JDI 4, JDI 5, and JDI 6, negative numbers indicate improvement because increases on these measures were desirable. Therefore, a  $\Delta$  which follows the mean difference scores denotes a change in the predicted direction.

The first analyses that were run were canonical correlations. These were completed in order to determine the maximum possible correlation between the sets of independent and dependent variables, and to assess the significance of these correlations. The independent variables in these analyses included group membership, age, sex, and job status. The groups were effect coded for these analyses. Each group was compared against group 6. Thus, in the coding of the groups, the group of interest received a 1, group 6 received a -1, and all other groups received a 0. Effect coding was done in order to compare the four groups that had exercised at some point, and one group that had two consecutive lifestyle change classes, against a group that had not exercised and had only one lifestyle change class.

First, a canonical correlation was completed between the groups and the 18 dependent variables. This analysis revealed a significant overall canonical correlation between these two sets of variables ( $r=.64902$ ,  $p<.000$ ). This suggests a strong overall relationship between group membership and the 18 dependent variables.

A second canonical analysis was run between age, sex, and job status and the dependent measures. This canonical correlation was not significant ( $r=.41396$ ,  $p<.444$ ). This suggests that, at best, there is a weak relationship between age, sex, and job status, and the dependent variables.

A third canonical correlation was completed between the groups, age, sex, job status, and the dependent variables. This canonical was not significant ( $r=.42218$ ,  $p<.455$ ). The drop in the correlation when age, sex, and job status were added was an unusual finding. This drop was not due to a suppressor effect, but more likely to the fact that age, sex, and job status were predictors that overlapped with groups.

Because of the highly significant canonical correlation between the groups and the dependent variables, further analyses involving multiple regression were completed to determine which groups, as compared with group 6, were most highly associated with changes on each of the dependent measures. Entering the groups into the regression equation, and comparing the difference scores of the groups, showed that, in comparison with group 6, group 1 best reflected increases in diastolic blood pressure, decreases in satisfaction with the job in general, and improvements in satisfaction with people on the job. Group 3, as compared with group 6, best

reflected increases in cigarette smoking, improvements in satisfaction with supervision, and improvements in satisfaction with the job in general. Some of these findings were contrary to the initial predictions for this study. That is, groups 1 and 3, which were groups in the exercise program were expected to show decreases rather than increases in diastolic blood pressure and cigarette smoking.

Another canonical correlation was run with the six groups combined into two groups. Groups 1, 2, 3, and 5 were combined as one group consisting of exercisers, and groups 4 and 6 were combined as a second group consisting of non-exercisers. This canonical correlation was also highly significant ( $r=.63666$ ,  $p<.000$ ). This suggests a strong overall relationship between the groups and the dependent variables. Pearson correlations were then completed between the two groups and the dependent variables. Among these correlations, one was significant. The exercise groups were associated with increases in absenteeism ( $r=-.1559$ ,  $p<.05$ ).

A canonical correlation was also completed in which the six groups were combined into two groups in a different manner. That is, groups 1, 3, and 5 were combined into one group consisting of participants who were in the exercise program this session, and groups 2, 4, and 6 were combined into a second group consisting of participants

who were in the lifestyle change classes this session. This canonical was significant ( $r=.50364$ ,  $p<.05$ ), suggesting that there is a relationship between the groups and the dependent variables. Pearson correlations were then completed between the two groups and the dependent variables. Among these correlations, four were significant. The exercise groups were associated with increases in weight ( $r=-.1623$ ,  $p<.04$ ), diastolic blood pressure ( $r=-.1779$ ,  $p<.03$ ), estimates of fitness ( $r=-.1574$ ,  $p<.05$ ), and satisfaction with people ( $r=-.2465$ ,  $P<.005$ ). The increases in estimates of fitness and satisfaction with people were supportive of the initial hypotheses for this study, but the increases in weight and diastolic blood pressure were contrary to the initial hypotheses.

A principal components analysis with varimax rotation was completed to determine whether or not the 18 dependent variables could be reduced to a smaller number. This analysis showed that the dependent variables were loaded on seven factors (see Table 3). Satisfaction with the job in general had the highest loading on factor 1. Weight received the highest loading on factor 2, systolic blood pressure on factor 3, stress related to co-workers on factor 4, cigarette smoking on factor 5, coffee consumption on factor 6, and absenteeism on factor 7.

A canonical correlation was completed between the six

effect coded groups and the dependent variables that loaded highest on the seven factors. This correlation was not significant ( $r=.32336$ ,  $p<.14$ ). This suggests that any overall relationship which may exist between the groups and the test representing the seven factors, is a weak relationship.

Table 3

Highest Loadings of the Dependent Measures on the Factors from the Principal Components Analysis

Factor	1	2	3	4	5	6	7
JDI 6	.720						
Wt.		.623					
SYS			.507				
JTI 3				.661			
Cigs.					-.511		
Cof.						-.586	
Abs.							-.427

A second canonical correlation was completed between the condensed groups of exercisers and non-exercisers and the tests representing the seven factors. This correlation was also not significant ( $r=.28371$ ,  $p<.27$ ). Again, evidence of a significant overall relationship between the groups and the seven factors was not found.

The final analysis that was done was a multiple analysis of covariance (MANCOVA). The MANCOVA was completed in order to determine whether there would be evidence of an overall relationship between the groups and the dependent variables after adjusting for the pretest differences among the groups. This analysis was not significant ( $F(90,420)=1.22, p<.10$ ). Thus, statistically equating the groups on pretest did not reveal a strong overall relationship between the groups and the pretest scores on the dependent variables.

To summarize the significant findings then, group 1, as compared with group 6, showed an increase in diastolic blood pressure, a decrease in satisfaction with the job in general, and improvements in satisfaction with people. Group 3, as compared with group 6, showed an increase in cigarette smoking, and improvements in satisfaction with supervision, and with the job in general. It was also found that membership in groups 1, 3, and 5 was associated with increases in absenteeism, weight, diastolic blood pressure, estimates of fitness, and satisfaction with people. These findings supported the initial hypothesis that the exercise groups would be associated with improvements in estimates of fitness, satisfaction with supervision, with people, and with the job in general. However, contrary to the initial hypotheses the exercise groups were associated with increases in absenteeism,



weight, diastolic blood pressure, and cigarette smoking. Finally, the hypothesis that the exercise groups would be associated with improvements on the remaining dependent measures was also not supported.

## CHAPTER 5

### Discussion

The results of the data analyses neither totally supported nor totally negated the initial hypotheses delineated for this study. The hypotheses that the exercise program would be associated with improvements in estimates of fitness, satisfaction with supervision, with people, and with the job in general were supported. However, the remaining hypotheses that exercise would predict changes in weight, blood pressure, heart rate, cigarette smoking, caffeine and alcohol consumption, absenteeism, level of job stress, and satisfaction with work, with pay, and with promotion, better than the lifestyle change classes were not supported. In fact, it appeared that the exercise program showed a detrimental effect in terms of weight, diastolic blood pressure, cigarette smoking, and absenteeism. However, another interpretation of these results could be that a factor other than exercise accounted for positive changes on these measures in the non-exercise or lifestyle change groups. A positive change in the lifestyle change groups as a result of some factor other than exercise would statistically appear as if exercise were associated with negative changes on these measures. Finally, the hypotheses that no significant differences between the exercise and lifestyle change classes would be found on

the basis of age, sex or job status, were supported.

Looking at the pretest means may offer some explanation for the results. The means for the blood pressure, heart rate, cigarette smoking, caffeine and alcohol consumption, absenteeism, and job stress measures were relatively low for all groups at pretesting. Thus, there was little room for improvement on these measures. The job satisfaction measures were moderate at pretesting, such that there was more room for improvement on these measures. It is possible that 12 weeks is a rather short time span for any extreme changes in job satisfaction to occur. The exercise program did predict changes on three of the six job satisfaction measures, despite this possibility.

The results of this study did not lend support to current research in terms of positive changes in weight, blood pressure, heart rate, absenteeism, and stress level (Fielding, 1982, Haskell & Blau, 1980). The results added to current research, however, in that job satisfaction has not been previously found to be associated with exercise programs. Therefore, the positive changes that were found on the various job satisfaction measures suggests benefits of exercise programs which have not been previously shown. A comparison of exercise programs and lifestyle change programs has not been previously reported in the literature. However, generalizing from the research

published separately in the two areas suggests that exercise programs have proven to be somewhat more successful. This study lends some credence to this generalization since the exercise program was the only program to show positive changes on the dependent measures. Because the individual lifestyle change classes were not examined as separate entities, this study does not add new information regarding the efficacy of these programs to that which already exists in the field.

There are several limitations which must be considered when examining the results of this study. First, the quasi-experimental design of this study limits the conclusions which can be drawn. Anytime participants select themselves into groups there may be differences between the groups prior to the initiation of a treatment program. This, in fact, was found to be true in this study. It can be argued, however, that the groups should be studied as they naturally occur, and if self-selection is a part of that natural process then that is the context in which the groups should be studied. More than anything, then, the self-selection factor limits the generalizability of this study.

The generalizability of this study is also limited by the fact that the study was conducted in one organization and in one geographic location. Thus, the results that were found may not be relevant for another organization,

or even for the same organization in another location. To the extent that programs in other organizations resemble the program at AT&T, the generalizability of this study's results will be enhanced.

Another problem in terms of generalizability, is the difference in the amount of time the participants invested in the different types of classes. For example, the exercise program met for one hour three times per week for 12 weeks, while the stress management class met for one and one-half hours per week for eight weeks, and the hypertension control class met for one hour every other week for eight weeks. The point made previously regarding self-selection may be reiterated here. That is, the groups should be studied as they naturally occur, and if the time difference is inherent in the way the groups are structured then that is the way they should be studied. Furthermore, the time allotted to each of the classes in this study is consistent with time allotted to similar classes as reported in the research literature. The generalizability of this study then, is limited due to self-selection and time difference factors, and to the fact that the study was completed in one organization.

One more limitation of this study is the reliance on self-report measures for all the dependent variables except blood pressure and heart rate. The use of self-report measures also limits the conclusions which can be

drawn from this study.

There are some implications from this study that may be useful. Despite the highly significant canonical correlations which initially suggested that the exercise and lifestyle change programs were correlated with changes on the dependent measures, the results of more refined analyses failed to reveal much additional information. There is a general implication that the exercise program was somewhat more effective than the lifestyle change programs but this was limited to 4 of the 18 dependent measures. The lack of success in supporting the initial hypotheses of this study could be a result of the relatively healthy scores for all groups which were found on the various measures at pretesting, resulting in less room for improvement on these measures. In any case, the statements made about the research to date in this area, may also be made with respect to this study. That is, although the results are encouraging, especially with respect to improvements in job satisfaction, more research is necessary before any firm conclusions can be drawn. In terms of implications for the field of Counseling Psychology, the fact that the exercise program significantly predicted improvements on several job satisfaction measures suggests that this may be an area for further research. The study of exercise or wellness programs with respect to job satisfaction would be a

totally new arena in job satisfaction research.

Counseling Psychology is most often associated with the improvement of a person's general well-being rather than with clinical treatment. With this notion in mind, studying wellness programs for their possible value in improving a person's level of job satisfaction would be a positive contribution to the field, considering the amount of time people spend working in their lifetimes.

Several recommendations can be made for future research in this area. First, results of future studies such as this one would be less nebulous if the study were to be carried out with participants who newly enter the wellness program, rather than with participants who have cycled through several different types of classes. Any changes which then occurred could be more readily attributed to the program under investigation. A second recommendation is to carry out the study in more than one organization, or in the same organization at more than one geographic location in order to enhance the generalizability of the results. Looking at exercise versus lifestyle change programs was an interesting way to approach this research, but future studies would add more to the knowledge base in this field if exercise would be compared to lifestyle change programs, and both of these would be compared to a control group. It would then be possible to determine not only which program was more

effective, but also whether either program was better than no program at all.

In summary then, this study supported some of the initial hypotheses and added to the findings of previous research in this field in terms of positive changes in estimates of fitness, satisfaction with supervision, with people, and with the job in general. Other hypotheses and results of previous research such as improvements in weight, blood pressure heart rate, absenteeism, and job stress were not supported. There are limitations of this study, especially with respect to the generalizability of the results, and the reliance on self-report measures. However, recommendations such as utilizing participants who are newly exposed to the various programs, expanding the study to several organizations, and adding a control group, would greatly enhance the results of future studies such as this one. The findings of this study with respect to job satisfaction not only adds new information to the literature on wellness programs but opens up a new area of research for the field of Counseling Psychology. Thus, despite the limitations of this study, some interesting results were found. The paucity of reasearch in the area of wellness programs which exists to date, suggests that wellness programs show promise. Although this study continues to support that notion, more research is necessary before any firm conclusions can be drawn.



## References

- Abrams, D. B., & Follick, M. J. (1983). Behavioral weight-loss intervention at the worksite. Journal of Consulting and Clinical Psychology, 51, 226-233.
- Alderman, M., Green, L. W., & Flynn, B. S. (1980). Hypertension control programs in occupational settings. Public Health Reports, 95, 158-163.
- Ardell, D. B. (1979). High level wellness. New York: Bantam Books.
- Blumenthal, J. A., Williams, R. S., Needels, T. L., & Wallace, A. G. (1982). Psychological changes accompany aerobic exercise in healthy middle-aged adults. Psychosomatic Medicine, 44, 529-536.
- Brayfield, A. H., & Crockett, W. H. (1955). Employee attitudes and employee performance. Psychological Bulletin, 52, 396-424.
- Caplan, R. D. (1975). Job demands and worker health: Main effects and occupational differences. Ann Arbor, MI: Institute for Social Research.
- Cooper, C. L. & Marshall, J. (1976). Occupational sources of stress: A review of the literature relating to coronary heart disease and mental ill health. Journal of Occupational Psychology, 49, 11-28.
- Cox, T. (1978). Stress. London: MacMillan.
- Cox, T., & Mackay, C. J. (1976, November). A

psychological model of occupational stress. Paper presented to Medical Research Council meeting on Mental Health in Industry, London.

Danaher, B. G. (1980). Smoking cessation programs in occupational settings. Public Health Reports, 95, 149-157.

Dunn, H. L. (1961). High level wellness. Arlington, VA: R. W. Beatty.

Ferguson, D. (1973). A study of occupational stress. Ergonomics, 16, 649-664.

Fielding, J. E. (1982). Effectiveness of employee health improvement programs. Journal of Occupational Medicine, 24, 907-915.

Folkins, C. H., & Sime, W. E. (1981). Physical fitness training and mental health. American Psychologist, 36, 373-389.

Foreyt, J.P., Scott, L.W., & Gotto, A. M. (1980). Weight control and nutrition education programs in occupational settings. Public Health Reports, 95, 127-136.

French, J. R. P., & Caplan, R. D. (1973). Organizational stress and individual strain. In A. J. Morrow (Ed.), The failure of success (pp. 30-66). New York: AMACOM.

Goldberg, P. (1978). Executive health. New York: McGraw-Hill.

- Goldfried, M. R., Decenteceo, E. T., & Weinberg, L. (1974). Systematic rational restructuring as a self-control technique. Behavior Therapy, 5, 247-254.
- Greenwood, E. D. (1976). Emotional well-being through exercise: Therapeutic benefit for the adult. In T. T. Craig (Ed.), The humanistic and mental health aspects of sports, exercise, and recreation (pp. 130-133). Chicago: American Medical Association.
- Gruneberg, M. M. (1979). Understanding job satisfaction. London: MacMillan.
- Haskell, W. L., & Blair, S. N. (1980). The physical activity component of health promotion in occupational settings. Public Health Reports, 95, 109-118.
- Herzberg, F., Mausner, B., & Snyderman, B. (1959). The motivation to work. New York: Wiley.
- Hopppock, R. (1935). Job satisfaction. New York: Harper.
- Jenkins, D. C. (1971). Psychologic and social precursors of coronary disease. New England Journal of Medicine, 284, 307-317.
- Joseph, J. J. (1967). The relationship of selected fitness test scores to the chronic complaints and ailments of adult males. Journal of Sports Medicine, 7, 83-94.

- Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., & Rosenthal, R. A. (1964). Organizational stress. New York: Wiley.
- Kanzler, M. Zeidenberg, P., & Jaffe, J. H. (1976). Response of medical personnel to an on-site smoking cessation program. Journal of Clinical Psychology, 32, 670-674.
- Kobasa, S. C., Maddi, S. R., & Pucetti, M. C. (1982). Personality and exercise as buffers in the stress-illness relationship. Journal of Behavioral Medicine, 5, 391-404.
- Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. New York: Springer.
- Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology (pp. 1297-1349). Chicago: Rand McNally.
- Lunney, G. H. (1970). Using analysis of variance with a dichotomous dependent variable: An empirical study. Journal of Educational Measurement, 7, 263-269.
- Lyons, T. F. (1972). Turnover and absenteeism: A review of relationship and shared correlates. Personnel Psychology, 25, 271-281.
- Martin, J. E., & Dubbert, P. M. (1982). Exercise applications and promotion in behavioral medicine: Current status and future directions. Journal of

- Consulting and Clinical Psychology, 50, 1004-1017.
- Maslow, A. H. (1943). A theory of human motivation.  
Psychological Review, 50, 370-396.
- Matarrazo, J. D. (1980). Behavioral health and  
behavioral medicine. American Psychologist, 35,  
807-817.
- Meichenbaum, D. & Turk, D. (1982). Stress, coping, and  
disease: A cognitive-behavioral perspective. In R.  
W. J. Neufeld (Ed.), Psychological stress and  
psychopathology. New York: McGraw-Hill.
- Morse, D. R., & Furst, M. L. (1979). Stress for  
success. New York: Van Nostrand Reinhold.
- Moss, R. H. (1977). The human context: Environmental  
determinants of behavior. New York: Wiley.
- Nicholson, N., Brown, C. A., & Chadwick-Jones, J. K.  
(1976). Absence from work and job satisfaction.  
Journal of Applied Psychology, 61, 728-737.
- Palmore, E. (1969). Predicting longevity: A follow-up  
controlling for age. The Gerontologist, 2, 247-  
250.
- Parkinson, R. (1982). Managing health promotion in the  
workplace: Guidelines for implementation and  
evaluation. Palo Alto, CA: Mayfield Publishing.
- Pelletier, K. R. (1977). Mind as healer, mind as  
slayer. San Francisco: Robert Briggs.
- Peters, R. K., Benson, H., & Peters, J. M. (1977).

- Daily relaxation response breaks in a working population: Effects on blood pressure. American Journal of Public Health, 67, 954-959.
- Peters, R. K., Benson, H., & Porter, D. (1977). Daily relaxation response breaks in a working population: Effects on self-reported measures of health performance, and well-being. American Journal of Public Health, 67, 946-953.
- Porter, L. W., & Steers, R. M. (1973). Organizational work, and personal factors in employee turnover and absenteeism. Psychological Bulletin, 80, 151-176.
- Sales, S. M., & House, J. (1971). Job dissatisfaction as a possible risk factor in coronary heart disease. Journal of Chronic Diseases, 23, 867-873.
- Schwartz, G. E. (1980). Stress management in occupational settings. Public Health Reports, 95, 99-108.
- Selye, H. (1936). A syndrome produced by diverse nocuous agents. Nature, 138, 32.
- Smith, P. C., Kendall, L. M., & Hulin, C. L. (1969). The measurement of satisfaction in work and retirement. Chicago: Rand McNally.
- Stunkard, A. J., & Brownell, K. D. (1980). Worksite treatment for obesity, American Journal of Psychiatry, 137, 252-253.
- Stunkard, A. & McLaren-Hume, M. (1959). The results of

treatment for obesity. Archives of Internal Medicine, 103, 79-85.

Theorell, T., & Rahe, R. H. (1970). Behavior prior to myocardial infarction. In T. Theorell (Ed.), Psychological factors in relation to the onset of myocardial infarction and to some metabolic variables: A pilot study. Stockholm: Karolinska Institute.

Thomas, G. S., Lee, P. R., Franks, P., & Paffenbarger, R. S., Jr. (1981). Exercise and health. Cambridge, MA: Oelgeschlager, Gunn, & Hain.

Vroom, V. H. (1964). Work and motivation. New York: Wiley.

Wanous, J. P., & Lawler, E. E. (1972). Measurement and meaning of job satisfaction. Journal of Applied Psychology, 56, 95-105.

## APPENDIX A

### Job Tension Index

All of us occasionally feel bothered by certain kinds of things in our work or jobs. Below is a list of things that sometimes bother people and I would like you to tell me how frequently you feel bothered by each of them. Please circle the most appropriate response.

1. Feeling that you have too little authority to carry out the responsibilities assigned to you.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

2. Being unclear on just what the scope and responsibilities of your job are.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

3. Not knowing what opportunities for advancement or promotion exist for you.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

4. Feeling that you have too heavy a work load, work that you can't possibly finish during an ordinary work day.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

5. Thinking that you'll not be able to satisfy the conflicting demands of various supervisors.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

6. Feeling that you're not fully qualified to handle your job.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5



7. Not knowing what your supervisor thinks of you, how he/she evaluates your performance.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

8. The fact that you can't get information needed to carry out your job.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

9. Having to decide things that affect the lives of individuals, people that you know.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

10. Feeling that you may not be liked and accepted by the people you work with.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

11. Feeling unable to influence your immediate supervisor's decisions and actions that affect you.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

12. Not knowing just what the people you work with expect of you.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

13. Thinking that the amount of work you have to do may interfere with how well it gets done.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

14. Feeling that you have to do things on the job that are against your better judgement.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

15. Feeling that your job tends to interfere with your family life.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

16. Feeling that your progress on the job is not what it should be or could be.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

17. Thinking that someone else may get the job above you, the one you are directly in line for.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

18. Feeling that you have too much responsibility and authority delegated to you by your superiors.

NEVER	RARELY	SOMETIMES	OFTEN	NEARLY ALL THE TIME
1	2	3	4	5

## APPENDIX B

### Job Description Index

Think of your present work. What is it like most of the time? In the blank beside each word given below, write

Y for "Yes" if it describes your work  
N for "No" if it does NOT describe it  
? if you cannot decide

-----  
WORK ON PRESENT JOB

\_\_\_\_\_ Fascinating  
\_\_\_\_\_ Routine  
\_\_\_\_\_ Satisfying  
\_\_\_\_\_ Boring  
\_\_\_\_\_ Good  
\_\_\_\_\_ Creative  
\_\_\_\_\_ Respected  
\_\_\_\_\_ Hot  
\_\_\_\_\_ Pleasant  
\_\_\_\_\_ Useful  
\_\_\_\_\_ Tiresome  
\_\_\_\_\_ Healthful  
\_\_\_\_\_ Challenging  
\_\_\_\_\_ On your feet  
\_\_\_\_\_ Frustrating  
\_\_\_\_\_ Simple  
\_\_\_\_\_ Endless  
\_\_\_\_\_ Gives sense of  
accomplishment

Go on to the next page.....

Think of the pay you get now. How well does each of the following words describe your present pay? In the blank beside each word, put

Y if it describes your pay  
N if it does NOT describe it  
? if you cannot decide

-----  
P R E S E N T   P A Y   -----

\_\_\_\_\_ Income adequate for normal expenses  
\_\_\_\_\_ Satisfactory profit sharing  
\_\_\_\_\_ Barely live on income  
\_\_\_\_\_ Bad  
\_\_\_\_\_ Income provides luxuries  
\_\_\_\_\_ Insecure  
\_\_\_\_\_ Less than I deserve  
\_\_\_\_\_ Highly paid  
\_\_\_\_\_ Underpaid

Now please turn to the next page....

Think of the opportunities for promotion that you have now. How well does each of the following words describe these? In the blank beside each word put

Y for "Yes" if it describes your  
opportunities for promotion  
N for "No" if it does NOT describe them  
? if you cannot decide

----- OPPORTUNITIES FOR PROMOTION -----

- \_\_\_\_\_ Good opportunities for promotion
- \_\_\_\_\_ Opportunity somewhat limited
- \_\_\_\_\_ Promotion on ability
- \_\_\_\_\_ Dead-end job
- \_\_\_\_\_ Good chance for promotion
- \_\_\_\_\_ Unfair promotion policy
- \_\_\_\_\_ Infrequent promotions
- \_\_\_\_\_ Regular promotions
- \_\_\_\_\_ Fairly good chance for promotion

Go on to the next page.....

Think of the kind of supervision that you get on your job. How well does each of the following words describe this supervision? In the blank beside each word below, put

- Y if it describes the supervision  
you get on your job  
N if it does NOT describe it  
? if you cannot decide

----- SUPERVISION ON PRESENT JOB -----

- \_\_\_\_\_ Asks my advice
- \_\_\_\_\_ Hard to please
- \_\_\_\_\_ Impolite
- \_\_\_\_\_ Praises good work
- \_\_\_\_\_ Tactful
- \_\_\_\_\_ Influential
- \_\_\_\_\_ Up-to-date
- \_\_\_\_\_ Doesn't supervise enough
- \_\_\_\_\_ Quick tempered
- \_\_\_\_\_ Tells me where I stand
- \_\_\_\_\_ Annoying
- \_\_\_\_\_ Stubborn
- \_\_\_\_\_ Knows job well
- \_\_\_\_\_ Bad
- \_\_\_\_\_ Intelligent
- \_\_\_\_\_ Leaves me on my own
- \_\_\_\_\_ Around when needed
- \_\_\_\_\_ Lazy

Please go on to the next page...

Think of the majority of the people that you work with now or the people you meet in connection with your work. How well does each of the following words describe these people? In the blank beside each word below, put

Y if it describes the people you  
work with

N if it does NOT describe them

? if you cannot decide

----- PEOPLE ON YOUR PRESENT JOB -----

- \_\_\_\_\_ Stimulating
- \_\_\_\_\_ Boring
- \_\_\_\_\_ Slow
- \_\_\_\_\_ Ambitious
- \_\_\_\_\_ Stupid
- \_\_\_\_\_ Responsible
- \_\_\_\_\_ Fast
- \_\_\_\_\_ Intelligent
- \_\_\_\_\_ Easy to make enemies
- \_\_\_\_\_ Talk too much
- \_\_\_\_\_ Smart
- \_\_\_\_\_ Lazy
- \_\_\_\_\_ Unpleasant
- \_\_\_\_\_ No privacy
- \_\_\_\_\_ Active
- \_\_\_\_\_ Narrow interests
- \_\_\_\_\_ Loyal
- \_\_\_\_\_ Hard to meet

Think of your job in general. What is it like most of the time? In the blank beside each word given below write

Y if it describes your job  
N if it does NOT describe it  
? if you cannot decide

-----  
JOB IN GENERAL  
-----

\_\_\_\_\_ Pleasant  
\_\_\_\_\_ Bad  
\_\_\_\_\_ Ideal  
\_\_\_\_\_ Waste of time  
\_\_\_\_\_ Good  
\_\_\_\_\_ Undesirable  
\_\_\_\_\_ Worthwhile  
\_\_\_\_\_ Worse than most  
\_\_\_\_\_ Acceptable  
\_\_\_\_\_ Like to leave  
\_\_\_\_\_ Better than most  
\_\_\_\_\_ Disagreeable  
\_\_\_\_\_ Makes me content  
\_\_\_\_\_ Inadequate  
\_\_\_\_\_ Excellent  
\_\_\_\_\_ Rotten  
\_\_\_\_\_ Enjoyable  
\_\_\_\_\_ Poor

Copyright, 1975, Bowling Green State University.  
Revised January, 1982.



APPENDIX C

General Questionnaire

Name: \_\_\_\_\_

Age: \_\_\_\_\_ Sex: M F Height: \_\_\_\_\_' \_\_\_\_\_" Weight: \_\_\_\_\_ lbs.

Job Status: Management \_\_\_\_\_ Nonmanagement \_\_\_\_\_

Blood Pressure: \_\_\_\_\_/\_\_\_\_\_ Pulse: \_\_\_\_\_

Do you exercise on your own? \_\_\_\_\_ Since \_\_\_\_\_

Frequency of exercise: \_\_\_\_\_ times per week

Duration of exercise: \_\_\_\_\_ hours \_\_\_\_\_ minutes

If you do not exercise, how long since you have  
exercised regularly? \_\_\_\_\_

Type of exercise then: \_\_\_\_\_

Frequency: \_\_\_\_\_ times/week Duration: \_\_\_\_\_ minutes

Name of class in which you are enrolled: \_\_\_\_\_

Name of class in which you were enrolled last session:  
\_\_\_\_\_

Do you smoke? \_\_\_\_\_ # \_\_\_\_\_ packs/cigarettes per day

Do you drink coffee? \_\_\_\_\_ # \_\_\_\_\_ cups per day

Do you drink alcohol? \_\_\_\_\_ # \_\_\_\_\_ glasses per day/week

How many days were you absent from work in the past  
three months? \_\_\_\_\_

How would you estimate your current level of fitness?

POOR AVERAGE GOOD EXCELLENT

How well do you think you could perform on a test of  
physical fitness?

POOR AVERAGE GOOD EXCELLENT

How easy would it be for you to run 2 miles?

VERY DIFFICULT            SOMEWHAT DIFFICULT            FAIRLY EASY

How far do you think you could run in 12 minutes

compared with someone your same age and sex?

BELOW AVERAGE            ABOUT AVERAGE            ABOVE AVERAGE

## APPENDIX D

### Statement of Consent

The Department of Counseling Psychology supports the practice of protection for human subjects participating in research. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time.

This study is concerned with job stress and job satisfaction. You will be asked to complete two questionnaires at the beginning of the Total Life Concept (TLC) program in which you have enrolled at AT&T. The questionnaires take approximately 20 minutes to complete. At the end of your TLC program you will again be asked to complete these questionnaires.

Your participation is solicited but strictly voluntary. Do not hesitate to ask any questions about the study by contacting the principal researcher. Be assured that your name will not be associated in any way with the research findings. The data collected will be confidential and only the investigators will have access to the data. Your cooperation is very much appreciated.

Sincerely,

Donna M. Genett  
Principal Researcher  
University of Kansas  
Department of Counseling Psychology  
116 Bailey Hall  
Lawrence, Kansas 66045

---

Signature of individual agreeing to participate

A copy of this form is available upon request.

## APPENDIX E

Group Means on the 18 Dependent Variables at Posttesting

Group	1	2	3	4	5	6
Wt.	133.08	168.53	153.15	147.70	152.00	152.83
SBP	120.17	122.42	118.70	120.00	120.80	117.83
DBP	76.92	76.74	78.40	79.90	78.53	78.50
PLS	69.75	74.53	78.60	75.30	70.00	77.50
Cigs.	0.00	1.05	3.45	6.00	1.47	1.75
Cof.	0.54	1.53	1.65	3.55	2.47	2.25
Alc.	1.71	2.68	3.45	0.85	3.13	0.42
Abs.	0.25	0.68	0.75	0.70	0.33	0.25
Est.	9.92	10.21	8.60	6.60	8.20	7.50
JTI 1	22.25	24.05	23.90	26.95	25.87	25.33
JTI 2	7.25	6.53	7.25	7.10	7.07	7.50
JTI 3	5.71	7.10	6.35	6.35	6.67	7.92
JDI 1	32.21	30.21	26.40	26.80	28.93	26.33
JDI 2	42.96	37.79	35.60	33.80	39.07	30.83
JDI 3	20.33	9.26	9.90	9.30	14.93	9.17
JDI 4	41.21	40.37	41.90	34.20	37.80	34.42
JDI 5	38.75	35.95	39.80	37.85	37.60	31.58
JDI 6	38.13	38.53	37.75	36.45	38.53	33.17